

**U.S. Wheat and Barley Scab Initiative  
Annual Progress Report  
September 15, 1999**

**Cover Page**

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<b>Year:</b>	<b>FY1999</b>
<b>Grant Number:</b>	<b>59-0790-9-058</b>
<b>Grant Title:</b>	<b>Fusarium Head Blight Research</b>
<b>Amount Granted:</b>	<b>\$9,756.00</b>

**Project**

<b>Program Area</b>	<b>Objective</b>	<b>Requested Amount</b>
Chemical & Biological Control	To identify application technologies that will maximize fungicide coverage and efficacy against FHB.	\$10,000
	<b>Requested Total</b>	<b>\$10,000<sup>1</sup></b>

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Principle Investigator

Date

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<sup>1</sup> Note: The Requested Total and the Amount Granted are not equal.

**Project 1: To identify application technologies that will maximize fungicide coverage and efficacy against FHB.**

1. What major problem or issue is being resolved and how are you resolving it?

The overall objective of this project is to identify application technologies that will maximize fungicide coverage and efficacy against FHB.

The first specific objectives was to further develop computer imaging technology for objective quantification of fungicide coverage on wheat /barley heads of different variety with different morphological differences. Under this objective, research was conducted in developing, another automatic thresholding algorithm that would automatically analyze the images of sprayed wheat/barley heads and segment (remove) the background (plant material). Thus, images contain only spray droplet information and these images are referred to as segmented images. The performance of this algorithm was compared and evaluated with that of a previously developed automatic thresholding algorithm "Modified Otsu". Current work is going on evaluating other potential five different automatic thresholding algorithms for satisfactory segmentation of sprayed images of wheat/barley heads.

A preliminary study was also conducted to determine the optimum concentration of fluorescent dye to be used for obtaining higher quality images of sprayed wheat/barley heads. In addition, the available computer imaging system was used for analyzing the images of sprayed wheat/barley heads that were obtained as a part of other parallel ongoing research on scab led by Dr. McMullen and Prof. Hofman of NDSU (also team of members of the current scab initiative).

During this reporting period, no work has been done for the objective 2 and it matches our original plan.

2. Please provide a comparison of the actual accomplishments with the objectives established.

The progress made so far in this project satisfactory considering the actual activation of the fund as compared to the proposed initial date. Progress could have been more if appropriate technical helps could have been hired.

3. What were the reasons established objectives were not met? If applicable.

There was some delay initially by the time the fund was activated and was made ready to be used. By that time, students were committed for their summer work and appropriate student help could be not hired in the summer of 1999.

4. What were the most significant accomplishments this past year?

Another potential robust algorithm (as part of objective 1) was developed and evaluated for its capability in automatically segmenting the images of sprayed wheat/barley heads. Appropriate/satisfactory segmentation of the droplet information is critical for the accurate spray coverage evaluation of the computer imaging system. A technical paper is being presented in the regional ASAE (American Society of Ag. Engineers) conference during September, 1999 based on the conducted research.. In addition, the imaging system was used to analyze the sprayed images of wheat/barley head obtained by other researchers (Dr. McMullen and Prof. Hofman of NDSU) who are also part of the scab initiative. An abstract and another technical paper have been developed for these collaborative works.

Include below a list of the publications, presentations, peer reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

1. Gu, H, S. Panigrahi and V. Hofman. 1999. Evaluation of image processing techniques for spray coverage evaluation for scab disease. ASAE Paper No. MBSK99-131. St. Joseph. MI.
2. McMullen, M, S. Halley, J. Pederson, J. Moos, V. Hofman, and S. Panigrahi. 1999. How spray nozzles, pressures, and gpa affect coverage and fungicide efficacy for Fusarium head blight control. Phytopathology.89.S106 (Abstract)
- 3 Hofman, V, M. McMullen, S. Panigrahi, T. Gregoire, S. Halley and D. Gu. Application equipment for the control of Fusarium head blight (scab). ASAE Paper No. MBSK 99-119. St. Joseph. MI.